In the holographic stereogram 51 produced after executing this viewing point conversion processing, the viewing point shifts from the hologram surface 51a toward the observer by the viewing point distance dv, thereby enabling for the reproduced image 60 to be shifted toward the observer by the viewing point distance dv accordingly, and to be positioned constantly in the vicinity of the hologram surface 51a, as shown in FIG. 7B. Therefore, a high resolution reproduced image 60 free from the spatial distortion and blurring can be observed in the holographic stereogram 51 at the viewing distance dv.

By the way, in this viewing point conversion processing, if there exists no viewing point (capturing point) of the parallax image data string D3 on the mapping line ml interconnecting between the exposure point ep of the holographic stereogram image H and the sampling point mp for the element hologram image data D5, a parallax image the viewing point of which is closest to the sampling point mp of the element hologram image data D5 is selected from among the parallax image data string D3 present on the sampling plane DV, for its mapping processing is executed. The element hologram image data D5 in this case may have a discontinuity between respective pieces of parallax information as mapped at respective sampling points mp, thereby causing a phenomenon called jaggy.

To solve such problem, in the holographic stereogram producing device 10, an image capturing time spatial parameter TSP for use at the time of forming the parallax image data string D3 is set up so as to be able to fill in and obtain continuous parallax information between

respective sampling points mp of the element hologram image data D5, and reconstruct a continuous element hologram image data D5 free from the jaggy phenomenon.

A method of setting up of the time spatial parameters will be described specifically by way of examples embodying the present invention.

Of the various time spatial parameters, those parameters to be defined and fixed by the optical system 15, as clearly known from FIG. 8, are the exposure angle θe, matching with the imaging angle of the second cylindrical lens 28, and the exposure pitch, namely, Δle which is the pitch of the element hologram image EH. Here, the display screen width ls of the transmission type liquid crystal display 29 is calculated by the following equation (2).

$$ls = 2dv \times (\tan\theta e/2) \text{ ---- } (2).$$

By the way, as described above, dv is the viewing point distance from the hologram surface 51a and is equal to the image shooting (capturing) distance df of the parallax image data string D3. The sampling pitch Δls of the element hologram image d2 is calculated by the following equation (3):

$$\Delta ls = ls/(nx-1) \text{ --- } (3),$$

where nx is the number of pixels in the element hologram image d2 in the parallax direction (x-axis direction).

Here, if the sampling pitch Δls of the element hologram image d2 and the exposure pitch of the element

hologram image EH, namely, Δle satisfy the condition of the following equation (4):

$$\Delta ls = w \times \Delta le \text{ --- } (4),$$

where w is a natural number, and if the imaging (shooting) pitch Δlc of the parallax image data string D3 holds a relation that

$$\Delta lc = \Delta le \text{ --- } (5),$$

there is assumed to exist the viewing point of the parallax image data string D3 on every mapping line ml described above, thereby ensuring for the parallax information in the element hologram image data D5 reconstructed by the viewing point conversion processing to become continuous, thereby eliminating the jaggy phenomenon.

As an appropriate time spatial parameter suitable for use at image shooting of the parallax image data string D3 that can satisfy the above-mentioned conditions, the image shooting distance df (= viewing point dv) of the parallax image data string D3 the observation distance of which may be of any value if practically allowable is the only one parameter that has a relatively high flexibility. Therefore, because it is advantageous to use the viewing point distance dv, this viewing point distance dv is calculated. An example of calculation of the time spatial parameter is described in the following.

For example, when producing a holographic stereogram 51 which has a horizontal width of 96.0 mm, a pitch of